



DINOSAURS!

• DISCOVER THE GIANTS OF THE PREHISTORIC WORLD •

34



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DINOSAURS!

• DISCOVER THE GIANTS OF THE PREHISTORIC WORLD •



IDENTIKIT

All you ever wanted to know about

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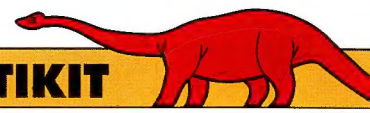
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LUFENGOSAURUS

Lufengosaurus was one of the earliest of the tall dinosaurs that browsed among the high tree-tops.



losely related to *Plateosaurus*, this Chinese dinosaur belonged to the family of prosauropods. A ravenous plant-eater, *Lufengosaurus* munched its way through the highest branches of the trees.

OLD TIMERS

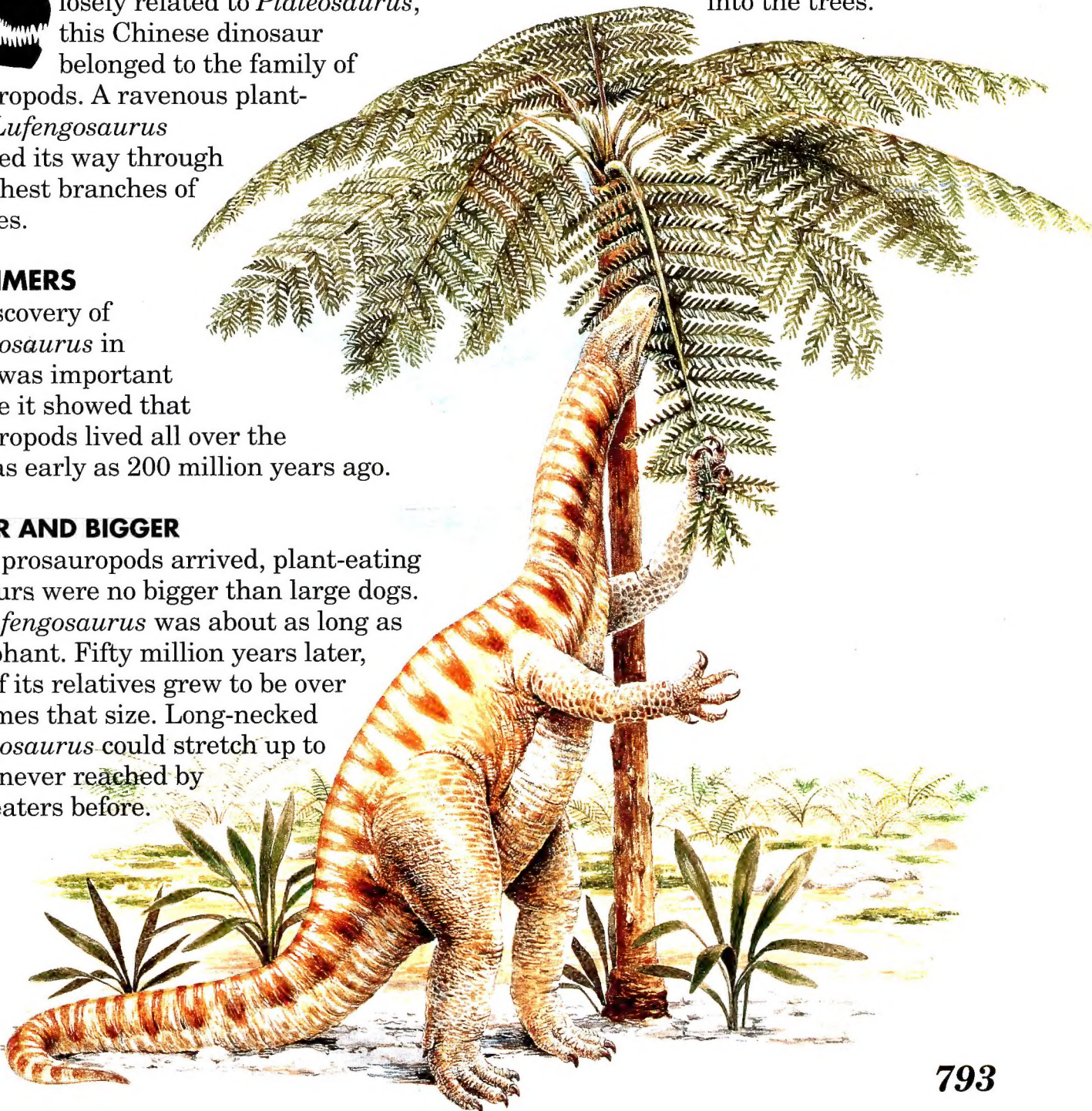
The discovery of *Lufengosaurus* in China was important because it showed that prosauropods lived all over the world as early as 200 million years ago.

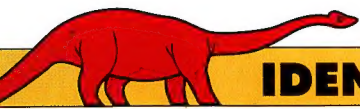
BIGGER AND BIGGER

Before prosauropods arrived, plant-eating dinosaurs were no bigger than large dogs. But *Lufengosaurus* was about as long as an elephant. Fifty million years later, some of its relatives grew to be over four times that size. Long-necked *Lufengosaurus* could stretch up to places never reached by plant-eaters before.

SHARP AS A SCYTHE

On the end of its thumb *Lufengosaurus* had a large curved claw as sharp as a scythe. It had many uses, such as tearing off leaves as it reared up into the trees.





IDENTIKIT

RAKING UP FOOD

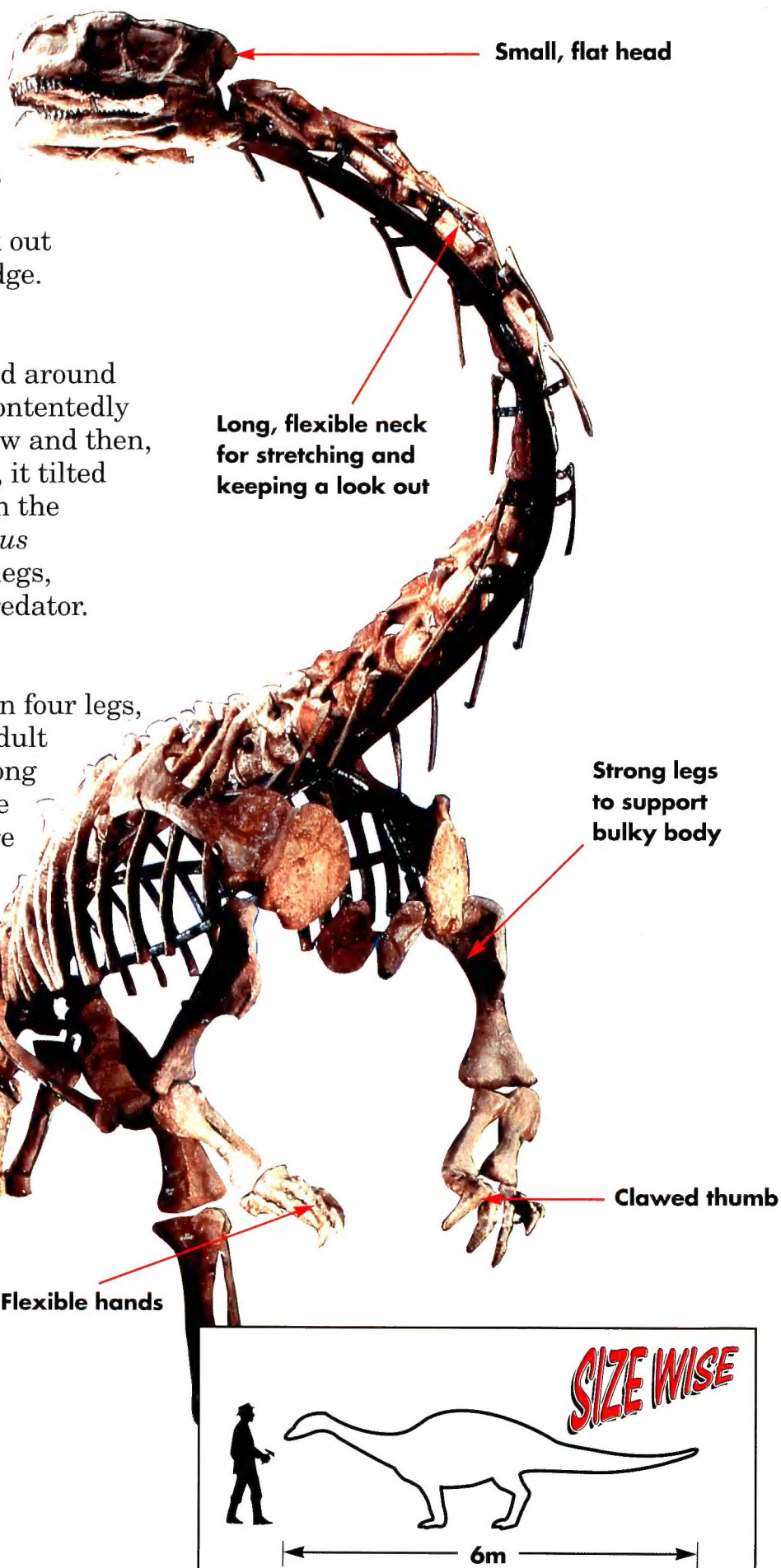
When it browsed at ground level *Lufengosaurus* used its claw as a rake for gathering plants. But if the dinosaur was startled by an enemy, its claw became a weapon and it struck out with the dangerous slashing edge.

TWO WAYS OF WALKING

Lufengosaurus probably ambled around on all fours most of the time, contentedly browsing on ground plants. Now and then, when it came across a tall tree, it tilted back on to its hind legs to reach the highest branches. *Lufengosaurus* sometimes walked on its hind legs, especially if threatened by a predator.

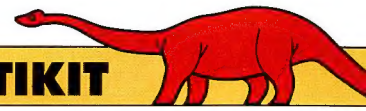
TIPTOES

When *Lufengosaurus* walked on four legs, it was about the height of an adult human's shoulder. It moved along on its toes like a cat or dog. The bones of its hands and feet were arranged so that they could bend backwards and lie flat on the ground. *Lufengosaurus* needed this stable support for its bulky body.



Muscular tail to lean back on

Strong, flexible feet



MONSTER FACTS

- **NAME:** *Lufengosaurus* (loo-feng-oh-saw-rus) means 'reptile from Lu-feng'
- **SIZE:** about 6m long
- **FOOD:** plants
- **LIVED:** about 200 million years ago in the Late Triassic/Early Jurassic Period in Sichuan and Yunnan Provinces, southern China

SUPPLE NECK

Lufengosaurus had a small, flat head at the end of a long, flexible neck. This helped it duck between branches for juicy titbits. *Lufengosaurus* could also stretch its neck up to keep a look out for danger.

FOOD FOR THOUGHT

Some experts argue that *Lufengosaurus*' jagged-edged teeth made it likely that it ate meat. Others think that it was an omnivore and ate both meat and plants. But there is good reason to believe that *Lufengosaurus* ate only plants.

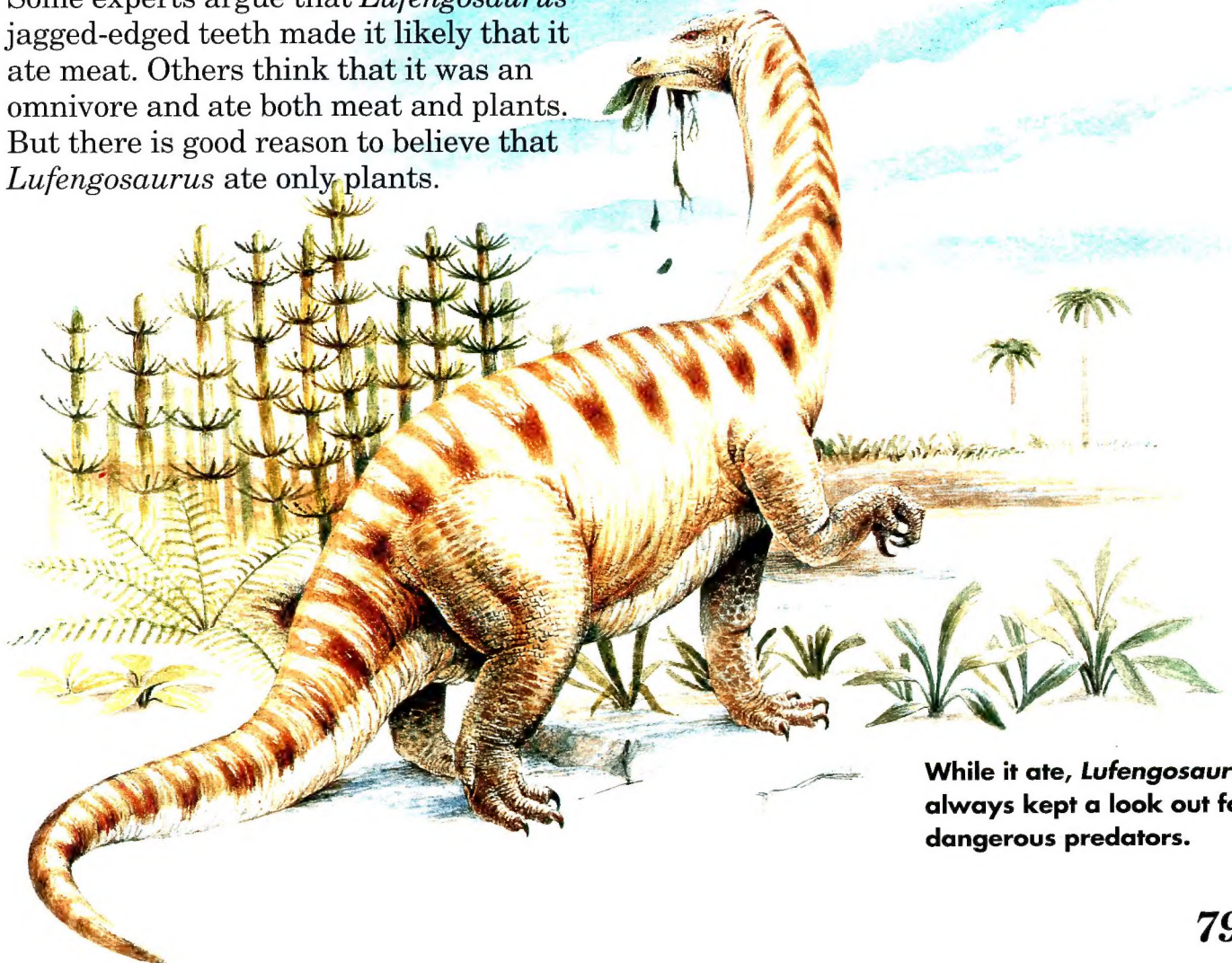
PLANT STRIPPER

Lufengosaurus had rough-edged teeth that were ideal for stripping leaves off branches. It swallowed its food whole without chewing it first and, like *Massospondylus*, *Lufengosaurus* probably swallowed stones which mashed up the food in its stomach, helping its digestion.

What is?

A PROSAUROPOD

Prosauropods were early plant-eating dinosaurs with long necks and tails. Prosauropods have been found all over the world and were common during the Late Triassic and Early Jurassic Periods. They were the ancestors of the huge sauropods such as *Apatosaurus*.



While it ate, *Lufengosaurus* always kept a look out for dangerous predators.



PROTOAVIS

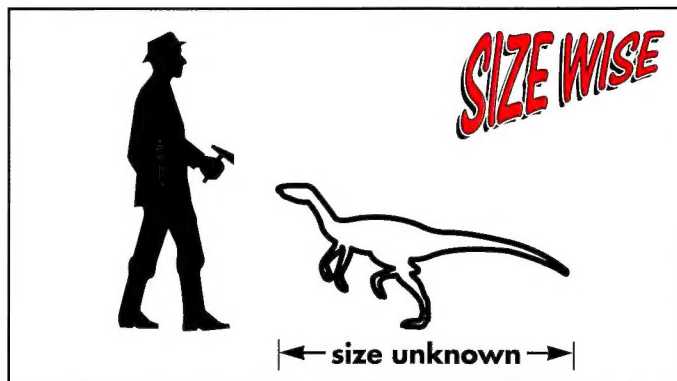
Scientists are still mystified by *Protoavis*. Was it a true ancestor of birds or a dinosaur bird-mimic?



The jumbled remains of what appeared to be two dinosaurs were found in Texas in 1986. The mystery is that in many ways *Protoavis* is like a bird and yet it also has some dinosaur features.

VARIED DIET

Protoavis had a few small teeth crowding the front of its jaws. It may have lived on tiny animals and insects. Some experts think it also ate fish.



MONSTER FACTS

- **NAME:** *Protoavis* (pro-toe-a-vis) means 'first bird'
- **SIZE:** length unknown
- **FOOD:** probably insects and small animals, possibly fish
- **LIVED:** about 210 million years ago in the Late Triassic Period in Texas, USA and Mongolia

CLUMSY FLIER

Protoavis would have made a clumsy flier. It had short arms and broad hands. Its feet and ankles were not like those of early birds. It may have been a theropod bird-mimic. It probably ran along on two legs with its small arms tucked into its sides.

ALL MIXED UP

Protoavis is a mystery because its bones may have been mixed up with those of other species, such as flying reptiles. Whether *Protoavis* was a flying reptile or an early dinosaur remains an unanswered question.



ABRICTOSAURUS

Fast-moving *Abrictosaurus* was the size of a sheep and ran on two legs.



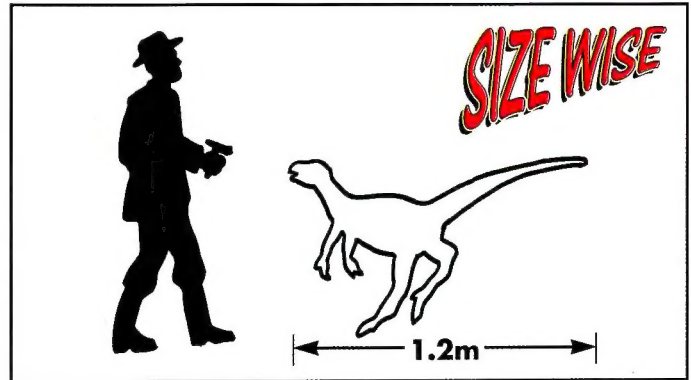
Abrictosaurus lived among the red rocks of southern Africa about 190 MYA. Experts think there were both wet and dry seasons there. Food was scarce in the dry season, but *Abrictosaurus* probably rested and waited for the rains, when plants grew again.

TUSKLESS SKULL

Everything known about *Abrictosaurus* is based on one skull. Although it does not have any tusks it looks so like the skull of *Heterodontosaurus* that some scientists think it is a female of that species. When *Abrictosaurus* ate, some experts think its jaws slid back and forth like an elephant's. This probably wore down its teeth.

TAKING A BREAK

Some experts think that *Abrictosaurus* may have been an 'aestivating' dinosaur. This means it became totally inactive. During the short, dry season it did not move or even eat, but saved its energy.

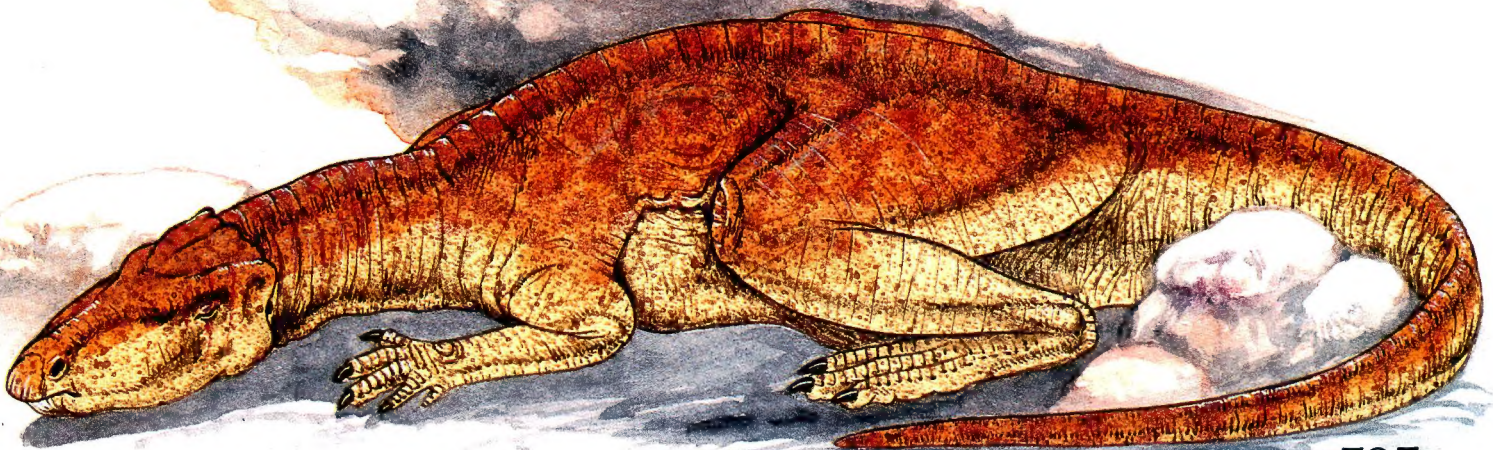


MONSTER FACTS

- **NAME:** *Abrictosaurus* (a-brik-toe-saw-rus) means 'wide-awake reptile'
- **SIZE:** about 1.2m long
- **FOOD:** plants
- **LIVED:** about 190 million years ago in the Early Jurassic Period in Lesotho, southern Africa

LAZY BONES

If *Abrictosaurus* did take a short rest from eating, its worn out teeth would have had time to regrow. None of these theories can be proved one way or the other, but they give an idea of what life may have been like for this tiny dinosaur.





Dinosaurs on the move

Did dinosaurs travel in search of better weather, food or shelter?



Imagine travelling regularly around the world. You could spend the summer where the weather's warm, but not too hot. In the autumn you could go to a subtropical place, to avoid the winter. Many creatures do this. They migrate – go on long journeys – each year. They do this to find better weather, food, shelter or breeding places.

DINOS OF THE FAR NORTH AND SOUTH

Did dinosaurs migrate? Perhaps. Fossils show that some dinosaurs lived near the Poles. There were duckbills like *Parasaurolophus*, meat-eaters similar to tyrannosaurs, and hypsilophodonts (dinosaur gazelles). How did these reptiles survive near the ends of the Earth, where no modern reptiles live?

THE LONG, DARK WINTER

The climate was warmer millions of years ago. The continents were in different places, and there were no ice caps. But there was still a long, dark season when it was cold and plants lost their leaves. This meant no food for plant-eaters. Without prey, could the meat-eaters survive?

SLEEPING TO SURVIVE?

How did these dinosaurs come to be so far north and south? Some scientists think they lived there all year. They may have hibernated through the cold months.

HUNTING IN THE DARK

Others think the dinosaurs stayed awake, hunting for food in the gloom. Fossils of *Leaellynasaura* found in south Australia show a brain with large optic lobes. These are the parts of the brain that deal with sight. Perhaps this dinosaur could see in the dark.



A SHORTAGE OF FOOD

But what did these dinosaurs eat? The plants that grew in the region dropped their leaves in winter. There would have been no leaves or other plants for these vegetarian dinosaurs. And how did they keep warm, so that they could stay active? No modern reptile has fur, or feathers, or a layer of fatty blubber (like polar bears or seals), to keep in their body warmth.

In such low temperatures reptiles would be too cold to move.

A hungry *Camarasaurus* herd (above) leaves a trail of devastation in its wake. The smaller stegosaurus (left) find tasty shoots among the debris.

DID THEY MIGRATE?

Many scientists think that some dinosaurs migrated to the Arctic for the summer, to eat the plants that grew there in the warmer months. They moved south again before the winter came.

LONG DISTANCE JOURNEYS

Migrating dinosaurs may have travelled enormous distances. The plant-eaters that journeyed to the Arctic for summer food may have covered distances of 3,000km. Fossil footprints provide some evidence for migration. Hundreds of tracks of plant-eating dinosaurs such as *Camarasaurus* have been found running parallel across mud buried millions of years ago. The smaller prints of youngsters are in the middle of the tracks.

TRAIL OF DESTRUCTION

Camarasaurus herds ate vast quantities of plants, even rearing up to strip the tree-tops. After devastating an area, they moved on. The moving herds left trails of churned soil. Perhaps this trail of destruction gave smaller plants more light and space to grow, and also encouraged the smaller dinosaurs that ate them.



Modern animals migrating (above): toads travel to their breeding ground.



DYING FOR A DRINK

Dinosaurs needed water, like all animals. In the centre of the super-continent of Pangaea, the land was dry and desert-like. Perhaps thirst drove the animals on long treks. Fossils of a herd of *Plateosaurus*, an early large dinosaur, were found in Germany. They may have been migrating in search of water, when they were drowned in a flash-flood.

FATAL STAMPEDE

Another herd, this time of the horned dinosaur *Centrosaurus*, may have died in a stampede. They could have drowned while trying to cross a river near the Red Deer River, Alberta, Canada. Or they may have just reached their watering place when they were panicked by a predator.

A PLACE TO BREED

Another reason that animals migrate today is to find a suitable place to rear a family. They need a safe place to breed, with plenty of food and water.



BEST FOR BABY

Very few fossils of young dinosaurs have been found. Skeletons of young dinosaurs have been found in icy, present-day Alaska. But no eggs, nests or babies have been found. Did the adults migrate south to lay their eggs, then lead their young back to the summer feeding grounds?

A huge *Centrosaurus* herd (below) migrates through a dusty landscape in search of food and water.





Bewick swans (left) breed in the Arctic, but spend their winters in Europe.

Today springbok herds (left) travel long distances from dry to wet areas to find food.

HOME SWEET HOME

Maiasaura nested regularly in Montana, USA. Thousands have been found, with lots of nests. Some hold eggs, others young. The signs are that *Maiasaura* mothers returned to the nest site every breeding season, stayed until the young could travel, then migrated away in search of food.

HORRIBLE CANNIBAL

Today, large reptiles such as crocodiles eat anything they catch, including the young of their own kind. This is called cannibalism.

ESCAPING TO SAFETY

The young of meat-eating dinosaurs may have needed to migrate away, to escape cannibalism. Fossils of young dinosaurs are rarely found with adults. The young could have travelled to upland areas and lived there until they were big enough to be safe among the adults.

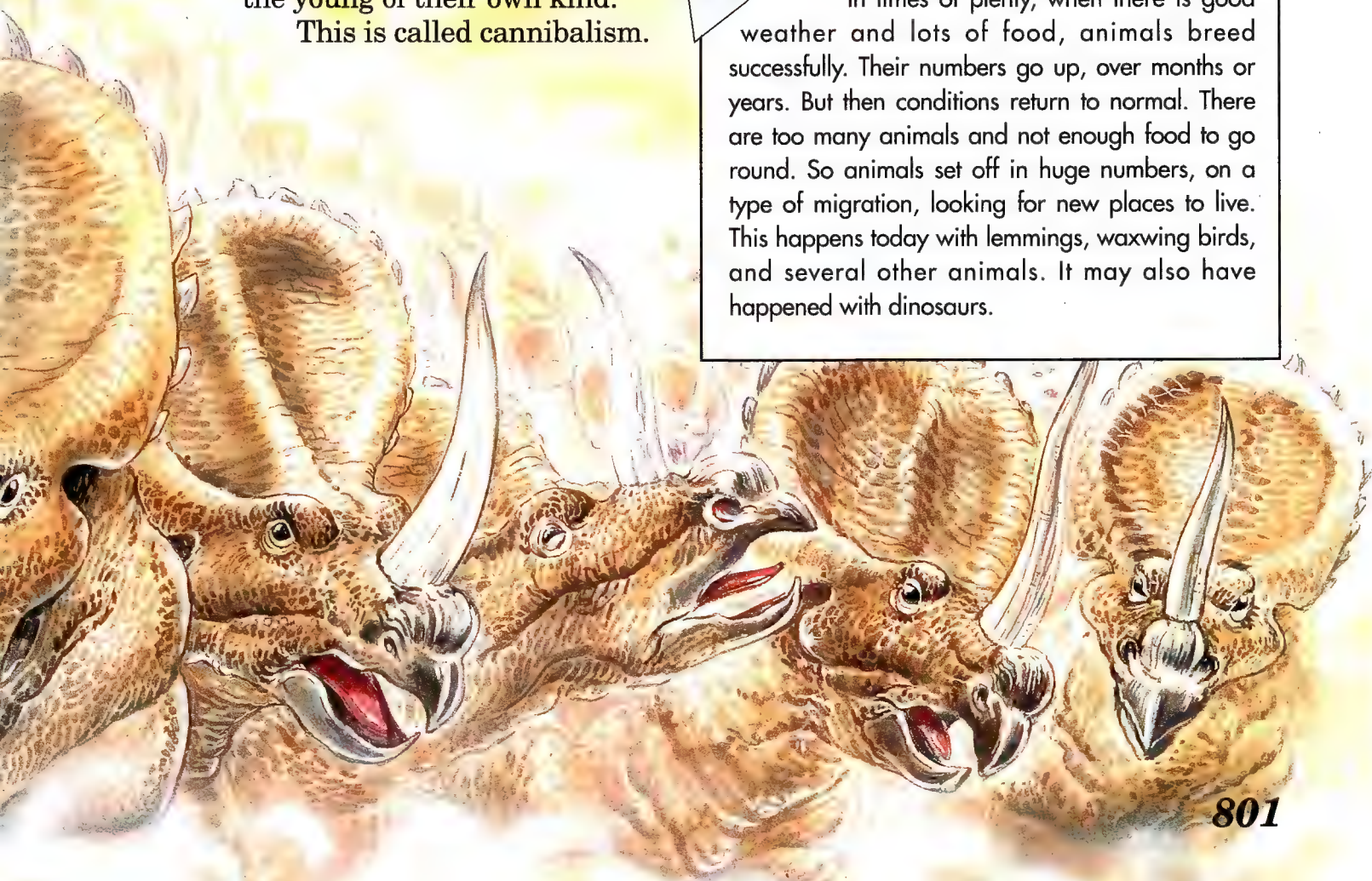
FROM PLACE TO PLACE

Whether they were searching for food, water, or safe places to live and breed, it is possible that dinosaurs were on the move throughout the Age of the Dinosaurs. As more and more fossils are discovered, the fascinating pattern of dinosaur lifestyles continues to unfold.

Is it true

that animals do not migrate every year?

In times of plenty, when there is good weather and lots of food, animals breed successfully. Their numbers go up, over months or years. But then conditions return to normal. There are too many animals and not enough food to go round. So animals set off in huge numbers, on a type of migration, looking for new places to live. This happens today with lemmings, waxwing birds, and several other animals. It may also have happened with dinosaurs.



GIANTS OF THE PAST

The illustration depicts a lush prehistoric forest. In the upper left, a red banner with a white border and black outline contains the title "GIANTS OF THE PAST" in a bold, stylized font. The forest is filled with tall, slender trees and dense green ferns. In the background, two orange dinosaurs with dark spots are visible; one is standing and the other is climbing a tree. In the foreground, the large, scaly orange hand and arm of a dinosaur are shown gripping a thick tree trunk, with its sharp claws visible. The ground is a mix of dirt and patches of green vegetation.

A detailed illustration of a Lufengosaurus in a lush Triassic forest. The dinosaur, with its orange-brown and red striped skin, is shown in the foreground, reaching up with its mouth open to eat from a green branch. In the background, another Lufengosaurus is visible near a large tree trunk. The forest is filled with various plants, including ferns and palm-like trees, with sunlight filtering through the canopy.

LUFENGOSAURUS

Deep in a lush Triassic forest in southern China a group of *Lufengosaurus* roams about feeding on the plants. The only sounds are the rustling and crunching of leaves and the snapping of branches. One *Lufengosaurus* rears up on its hind legs to reach a juicy branch. It wrenches the trunk down to get at the tasty morsels, tearing them off with razor-sharp teeth.

3-D Gallery 43

STEGOSAURUS V CERATOSAURUS



The silence of a North American plain is shattered as two ravenous *Ceratosaurus* pounce for the kill. Once they get their sharp claws and massive teeth into *Stegosaurus*' flesh, the peaceful plant-eater won't stand a chance .





WARMING UP AND

Dinosaurs existed for millions of years because they were very well adapted to their surroundings. Whatever the weather they were always able to warm up or cool down.



When we get cold we can warm up by running around and jumping up and down.

If it's hot we cool down by sweating. But dinosaurs didn't sweat and they certainly didn't jump up and down. So how did dinosaurs regulate the temperature of their bodies?

WALKING STOMACHS

One of the ways a dinosaur kept warm was by eating. Giant sauropods such as *Brachiosaurus* and *Diplodocus* had huge stomachs. They ate all day long so their stomachs were constantly in use. All the work of digesting the food in their stomachs created heat which helped keep the dinosaur warm. It must have been very noisy in a sauropod's stomach!

HUGE NOSTRILS

As well as digesting food *Brachiosaurus* kept warm by moving around, just as humans do. But, unlike us, it was easy for *Brachiosaurus* to overheat. If it needed to get cool again it would puff air in and out through its huge nostrils. This helped to cool the blood in its head.



Spinosaurus (left) stands sideways to the sun to pick up warmth through its sail.

When *Stegosaurus* wanted to get cool, it shunted blood to its plates where the air cooled it down, carrying the heat away from the animal.





COOLING DOWN

Right: standing with its back to the sun less of *Spinosaurus*' sail is heated and its blood cools off.

HOT AIR



SAILS AND PLATES

Two dinosaurs that lived in Africa in Cretaceous times had a clever way of regulating their body temperature. *Spinosaurus* and *Ouranosaurus* both had sails of skin attached by spines to their backs. These sails allowed the dinosaur to warm its blood rapidly when standing in the sun, and to let the heat out when the sail was pointed away from the sun. Some palaeontologists think that the plates on the backs of stegosaurs may also have helped regulate the animal's body temperature. The plates were rather like honeycombs. They were light and probably allowed large amounts of blood to pour in and out, warming the dinosaur up or cooling it down.

COOL HOLES

Experts think that when some dinosaurs got too hot they transferred heat around their bodies, in much the same way as birds do. Looking at skeletons like *T rex* scientists found holes in some bones. They think these may have held pockets of air which could absorb heat or cold.



Iguanas sunbathe on the Galapagos Islands.

IT'S A FACT

BASKING IGUANAS

The Galapagan Iguanas have a clever way of cooling down. They lie on rocks, basking in the bright sun, all day long. When it gets too hot they lift themselves up and cast a shadow to cool the rock below their bodies. When they settle down again their bellies get cool on the rock. They then shunt very hot blood from their backs round to the belly, where it soon cools.

The young ones

What were baby dinosaurs like and how did they live?

 **S**ome newly hatched dinosaurs were cared for by their parents. Others had to look after themselves. They were all easy prey for hungry meat-eaters. How did they manage to survive?

STAYING ALIVE

Dinosaur parents wanted to make sure that as many of their young survived as possible. They did this in different ways. Hadrosaurs, such as *Maiasaura*, nested together in big colonies to give their young extra protection from predators. Some dinosaurs laid large clutches of eggs to ensure that lots of young hatched out.

***Maiasaura* hatchlings were tiny. They stayed in the nest, fed and protected by their mother.**



The skeletons of several baby *Mussaurus* (above) have been found in a nest. The largest hatchling was about the same size as a kitten. No one knows why they died one day 200 million years ago. Perhaps they caught a killer disease, or were abandoned by their parents.



STAYING BY MUM

Maiasaura, the 'good mother lizard', fed its babies on berries, seeds and leaves for several months in the nest. Even when the young left the nest, they stayed close to their mother. Scientists have found fossils of junior *Maiasaura*, that had grown as big as 3m long, together with adults twice the size, in their nesting colony.

DINOSAUR NURSERIES

Hadrosaurs, such as *Maiasaura*, were gentle plant-eaters. Although they could run quite fast, they had no horns, spikes or armour, so they were easy prey for fierce carnivores. To protect themselves and their young, they stayed together in herds. Hadrosaur herds must have succeeded in keeping many predators away. Although they were so defenceless, experts agree that there were many more hadrosaurs than most other types of dinosaur.

FRIENDS FOR LIFE

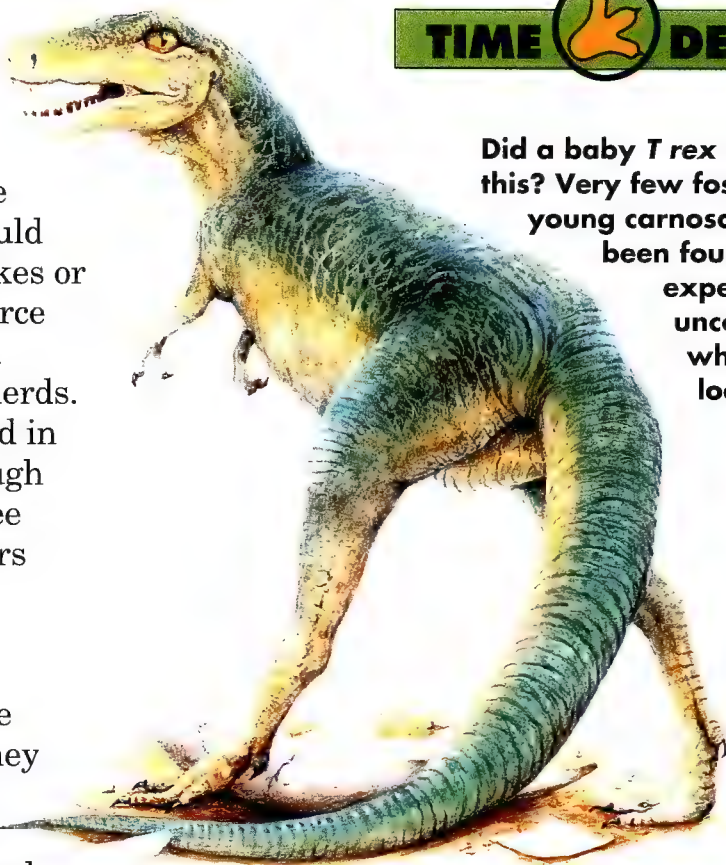
The young grew up in the safety of the herd and probably only left it when they were fully grown to mate or to form a herd of their own. Like some animals today, many dinosaurs may have stayed in the same herd for life.

PENGUIN PROTECTION

Like *Maiasaura*, modern penguins also rear their young in nurseries. They live in Antarctica, where there are no bushes to hide a nest or chicks. So penguins crowd together and stay close while they nest and rear their young to protect them from predators. Each chick is fed by its parents until it can look after itself.



Thousands of Emperor Penguins (above) live in colonies that are like huge outdoor nurseries.



Did a baby *T rex* look like this? Very few fossils of young carnosaurs have been found so experts are uncertain what they looked like.

ON THE PROWL

Dinosaur nests must have attracted all kinds of predators. They ate eggs or young and some of them ate both. Fossils of the speedy meat-eating dinosaurs *Troodon* and *Oviraptor* have been found near the nests of hadrosaurs and *Protoceratops*. This has made scientists think that these and other dinosaurs probably raided the nests.

IT'S A FACT

CHEEKY THIEF

Strange fossil eggs laid in pairs were found near the nesting sites of *Maiasaura* and *Orodromeus*. It turned out they belonged to a nest-raiding *Troodon*. The thief must have decided that a well-guarded nesting colony would be the ideal place to lay its own eggs!



HUNGRY YOUNGSTERS

Young dinosaurs must have needed a lot of food to grow so quickly. Even when they were fully grown, some adult dinosaurs needed to eat quite a lot. Some scientists think that an adult ceratosaur would have needed to eat about 31 tonnes of meat in its lifetime.

All dinosaurs grew quickly. The baby sauropod on the left was probably only one hundredth of its mother's weight when it was born.

GROWING UP

By studying fossil dinosaur embryos, scientists discovered that *Maiasaura* hatchlings were born with legs too weak for them to leave the nest. But *Orodromeus* hatchlings were strong enough to leave the nest straightaway. Scientists also studied the texture of fossil bones to work out how fast different types of dinosaur grew.

SMALL BEGINNINGS

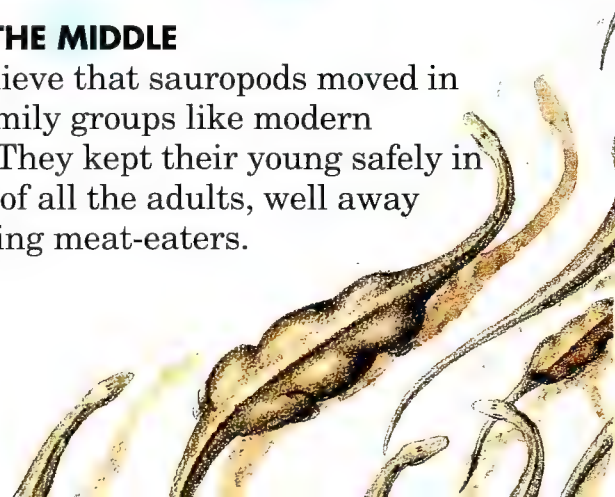
Dinosaur hatchlings were minute. It is hard to believe that such tiny creatures could grow to the enormous size of their mothers. But dinosaurs grew amazingly quickly. Experts have worked out that giant *Stegosaurus ungulatus* took just six years to become a 5 tonne adult. Today's rhinoceros grows at about the same rate.

HERD HELP

Some adult dinosaurs continued to care for their young as they grew up. Fossil trackways show that some dinosaur herds moved in a special way to protect their junior members. Scientists have found small footprints that were probably made by young sauropods surrounded by the much larger tracks of adults.

PIGGY IN THE MIDDLE

Experts believe that sauropods moved in herds or family groups like modern elephants. They kept their young safely in the middle of all the adults, well away from prowling meat-eaters.



BABY FACE?

Some fossil hatchling dinosaurs have large eyes, with short snouts and small horns, or crests. They look very different from modern baby lizards or snakes, which are more like little adults. Scientists think some baby dinosaurs are closer to today's birds, or mammals. They think some little dinosaurs had baby faces for a very important reason.



Big-eyed and baby-faced, a young *Maiasaura* (above) may have had the same appeal as the little harp seal pup on the right.

CUDDLY BABIES

Scientists believe that the big-eyed helpless babyishness of some young dinosaurs may have made their parents care for them.

Today, many young mammals, such as puppies, kittens and seals, have the same cuddly appeal.

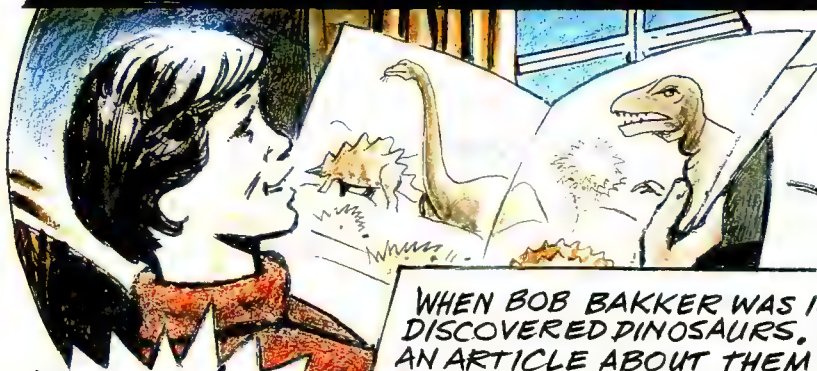
It makes their parents feed and protect them until they can look after themselves.



Left: a herd of sauropods on the move. The young stay safely in the middle.



DINO REBEL



GEE!
DINOSAURS ARE
AMAZING!

WHEN BOB BAKKER WAS 10, HE DISCOVERED DINOSAURS. HE READ AN ARTICLE ABOUT THEM IN A MAGAZINE AND WAS SO EXCITED HE DECIDED TO DEVOTE HIS LIFE TO THEM. AS A CHILD IN THE 1950S, HIS FAVOURITE PLACE WAS THE MUSEUM OF NATURAL HISTORY IN NEW YORK



THIS MUST BE THE
BEST DINOSAUR
SHOW IN THE
WORLD!

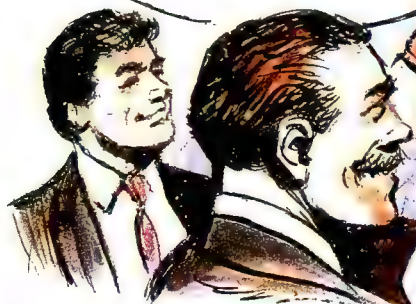
IN 1964, STILL A STUDENT, BAKKER WENT ON OSTROM'S EXPEDITION THAT DISCOVERED DEINONYCHUS. HE GRADUATED, CONTINUED TO STUDY DINOSAURS, AND CAME UP WITH SOME REVOLUTIONARY IDEAS



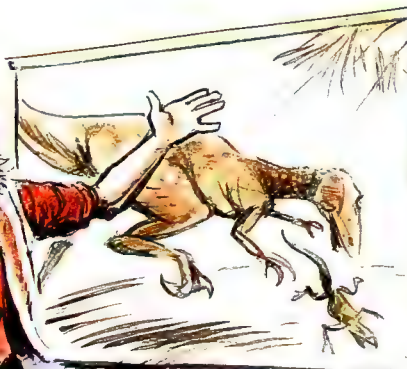
HE ARGUED THAT THEY WERE NOT FLODDING STUPID CREATURES, BUT SPEEDY, INTELLIGENT AND ENERGETIC. HE PUBLISHED HIS IDEAS IN BOOKS ILLUSTRATED WITH HIS OWN LIVELY DRAWINGS LIKE THE ONE ON THE LEFT



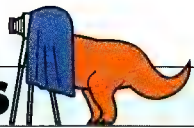
CROCODILES ARE SLOW BECAUSE THEY ARE COLD-BLOODED. I SAY ACTIVITY LIKE **THIS** CAN ONLY BE KEPT UP BY WARM-BLOODED CREATURES



I CAN'T AGREE WITH EVERYTHING YOU SAY BOB, BUT YOU ARE VERY PERSUASIVE!



LOOK AT THIS — I THINK TYRANNOSAURUS REX COULD HAVE BEEN VERY ENERGETIC AND AGILE!



AT HOME IN NEW JERSEY, USA, HE KEPT REPTILES



HE STUDIED THEM TO SEE HOW THEY MOVED

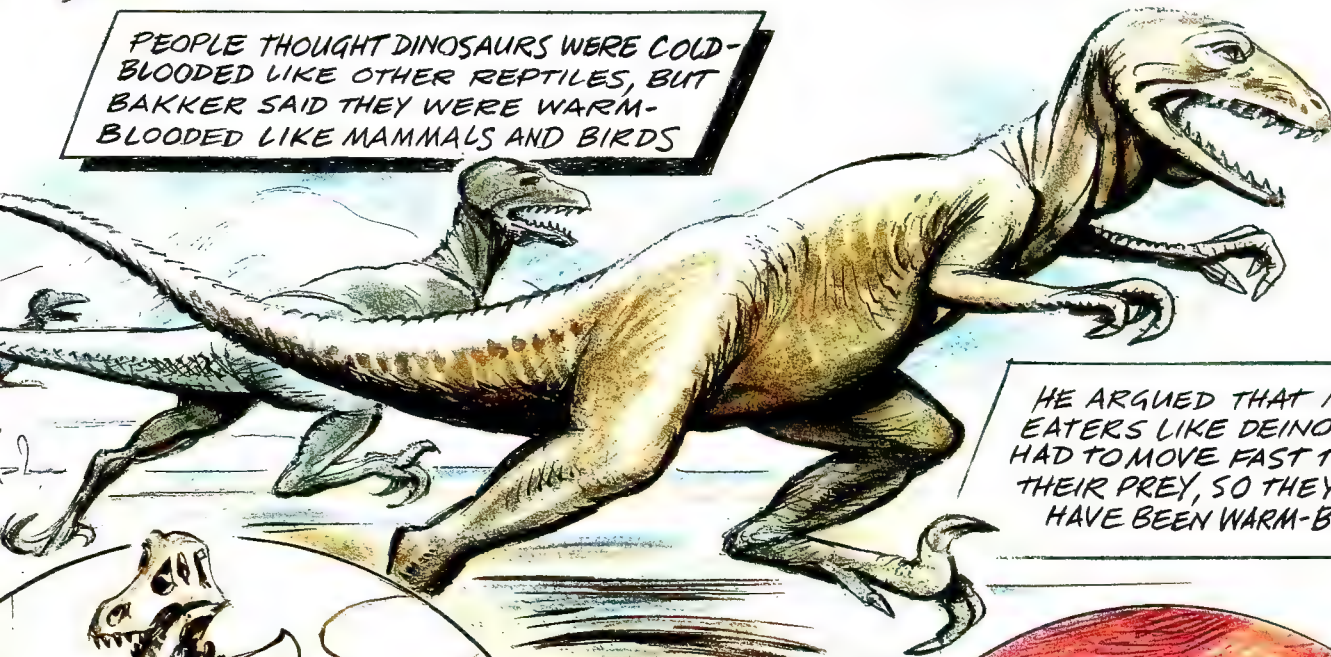
WHEN HE GREW UP HE WENT TO YALE UNIVERSITY TO STUDY PALAEOLOGY WITH THE GREAT PROFESSOR JOHN OSTROM



THIS YOUNG FELLER BAKKER SHOULD GO FAR - HE'S GOT WHAT IT TAKES!



PEOPLE THOUGHT DINOSAURS WERE COLD-BLOODED LIKE OTHER REPTILES, BUT BAKKER SAID THEY WERE WARM-BLOODED LIKE MAMMALS AND BIRDS



HE ARGUED THAT MEAT-EATERS LIKE DEINONYCHUS HAD TO MOVE FAST TO CATCH THEIR PREY, SO THEY MUST HAVE BEEN WARM-BLOODED



SOME PALAEOLOGISTS AGREE WITH DR. BOB BAKKER THAT DINOSAURS WERE WARM-BLOODED, OTHERS DO NOT. BUT ALL OF THEM ACKNOWLEDGE BAKKER'S CONTRIBUTION TO SCIENCE. MEANWHILE HE CONTINUES HIS WORK AT COLORADO UNIVERSITY, USA.

HE ALSO CONTINUES TO HUNT FOR DINOSAURS AT COMO BLUFF, SCENE OF THE BONE WARS. HE STRIDES ABOUT, ACCOMPANIED BY HIS DOG, FILLING NOTEBOOKS WITH IDEAS AND SKETCHES. AND JUST AS ENTHUSIASTIC AS HE WAS WHEN HE WAS 10 YEARS OLD!



Pat Williams

Improve and test your knowledge with... **DINO Fact File**

Follow the footprints to complete the quiz and get to the bottom of the question!

1

What were the prosauropods?

- a) bird-like dinosaurs
- b) duckbilled dinosaurs
- c) ancestors of sauropods

2

What was Bakker's new idea about dinosaurs?

- a) they were warm blooded
- b) they could spit poison
- c) they all walked on two legs

Fossil forest

In the deserts of Arizona, large sections of fossilized tree trunks stick up eerily out of the ground. They are a reminder that this land was once covered by the great forests of the Triassic.

6

Protoavis means:

- a) first dinosaur
- b) first bird
- c) first reptile

7

Utahraptor was a close relative

to which dinosaur?

- a) Velociraptor
- b) Gallimimus
- c) Brachiosaurus

8

How did *Spinosaurus* keep warm?

- a) by jumping up and down
- b) by standing in the sun
- c) by covering itself up with sand

9

Abriotosaurus' name means:

- a) wide-awake reptile
- b) abracadabra reptile
- c) brick reptile

Early dino fans

The very first dinosaur craze hit England in the 1850s. At that time only five dinosaurs had been described and named and people were very curious about them. In 1854, thousands queued to see life-sized models of the dinosaurs in the grounds of Crystal Palace in London.

Dinosaur Doyle

Arthur Conan Doyle, the author who created supersleuth Sherlock Holmes, was a keen tracker. In 1909, Doyle uncovered *Iguanodon* trackways very close to his home in Surrey, southern England, and proudly displayed the casts of the footprints in his house.

10

What did *Lufengosaurus* use its large curved claw for?

- a) to attack other dinosaurs
- b) to dig for food
- c) to tear off leaves

3

What did *Pachycephalosaurus* have on the end of its snout?

- a) short spikes
- b) long tusks
- c) a small bone

4

Which baby dinosaurs left their nest straightaway?

- a) *Maiasaura*
- b) *Orodromeus*
- c) *Brachiosaurus*

5

Why did dinosaurs migrate?

- a) because they were bored
- b) to look for food and shelter
- c) for the exercise

Ancient words

Many words start with 'palaeo', which comes from the Greek word meaning 'ancient'. There are palaeoartists (artists who draw prehistoric animals), palaeographers (people who study ancient writing), and of course palaeontologists (scientists who study prehistoric animals such as dinosaurs)! Can you think of any more?

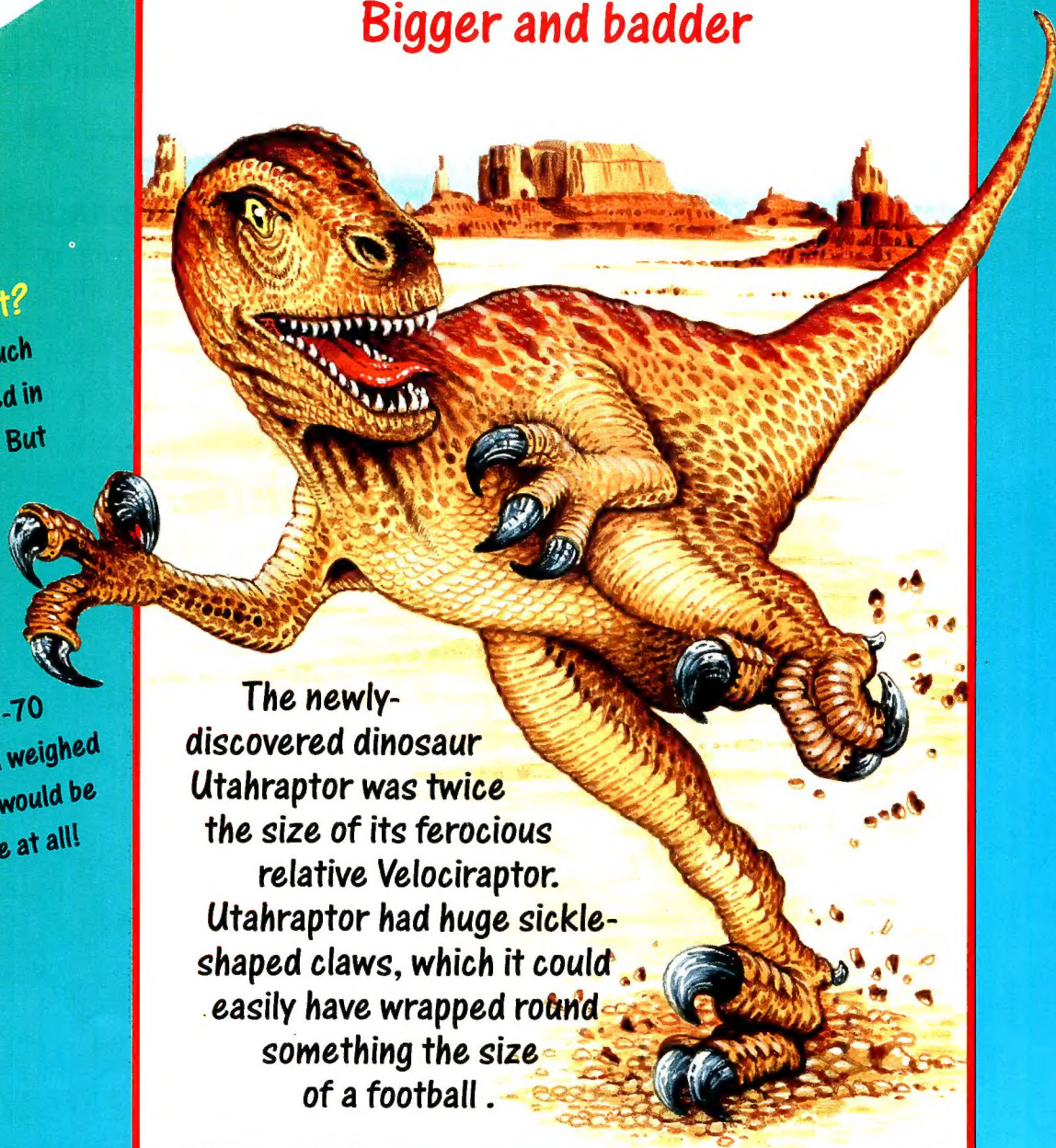
How big can dinos get?

The largest sauropods, such as *Seismosaurus*, weighed in at about 40-50 tonnes. But

has the biggest dinosaur been discovered yet?

Scientists put a weight limit on land animals of about 50-70 tonnes. If an animal weighed more than that, it would be too large to move at all!

Bigger and badder



The newly-discovered dinosaur *Utahraptor* was twice the size of its ferocious relative *Velociraptor*.

Utahraptor had huge sickle-shaped claws, which it could easily have wrapped round something the size of a football.

A to Z

OF DINOSAURS

OS - PA

OSHANOSAURUS

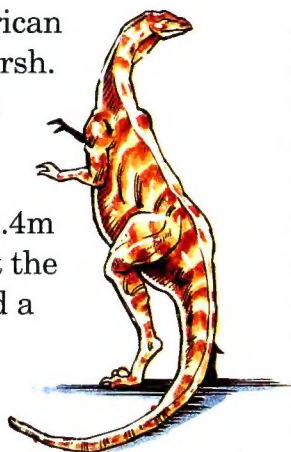
190 MYA

The early sauropod, *Oshanosaurus* (oh-sha-noh-saw-rus), was named in 1986. It was found in Yunnan Province, China and its name means 'Oshan reptile'. *Oshanosaurus* was a large, four-legged animal, longer than a lorry. It had a long neck and tail and a bulky body in between. It spent most of its day eating plants to fill its large stomach.

OTHNIELIA

150 MYA

Othnielia (oth-nee-el-ia) was named after the great American palaeontologist, Othniel Marsh. This small plant-eater lived in the Late Jurassic Period in Colorado and Wyoming, USA. *Othnielia* was about 1.4m long and ran on two legs. At the front of its small head it had a horny beak for nipping off leaves, and it looked out for predators with big, watchful eyes.

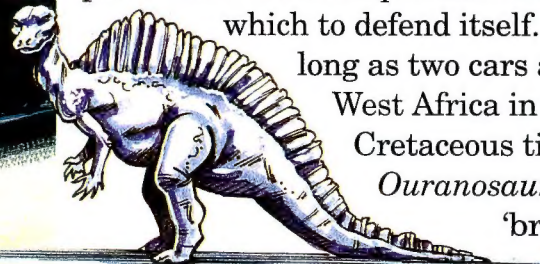


OURANOSAURUS

110 MYA

Ouranosaurus (oo-ran-oh-saw-rus) had a sail of skin supported by spines along its back and tail. The sail worked like a solar panel, soaking up the heat of the sun. This peaceful plant-eater had sharp thumb claws with which to defend itself. It was as long as two cars and lived in West Africa in Early Cretaceous times.

Ouranosaurus means 'brave reptile'.



OVI RAPTOR

80 MYA

Palaeontologists believe *Oviraptor* (oh-vi-rap-tor) meaning 'egg-thief', may have fed on the eggs of other dinosaurs. With its toothless beak and large, curved jaw it probably crushed the eggs, and then grasped their contents with its strong, three-fingered hands. Bird-like *Oviraptor* was as long as a small car and lived in Late Cretaceous times.

P

PACHYCEPHALOSAURUS

70 MYA

Pachycephalosaurus (pak-ee-sef-al-oh-saw-rus) used its head like a battering ram in contests with rivals. Its thick, dome-like head was decorated with a line of bony knobs at the back and sides. It had short spikes on the end of its snout. *Pachycephalosaurus* walked on two legs and ate plants. Its name means 'thick-headed reptile'.

PACHYRHINOSAURUS

75 MYA

Pachyrhinosaurus (pak-ee-rine-oh-saw-rus) lived in Alberta, Canada in the Late Cretaceous Period. Almost as long as an elephant, *Pachyrhinosaurus* had a short neck frill, trimmed with hornlets. Its name means 'thick-nosed reptile', after the mound of rough bone on top of its snout.

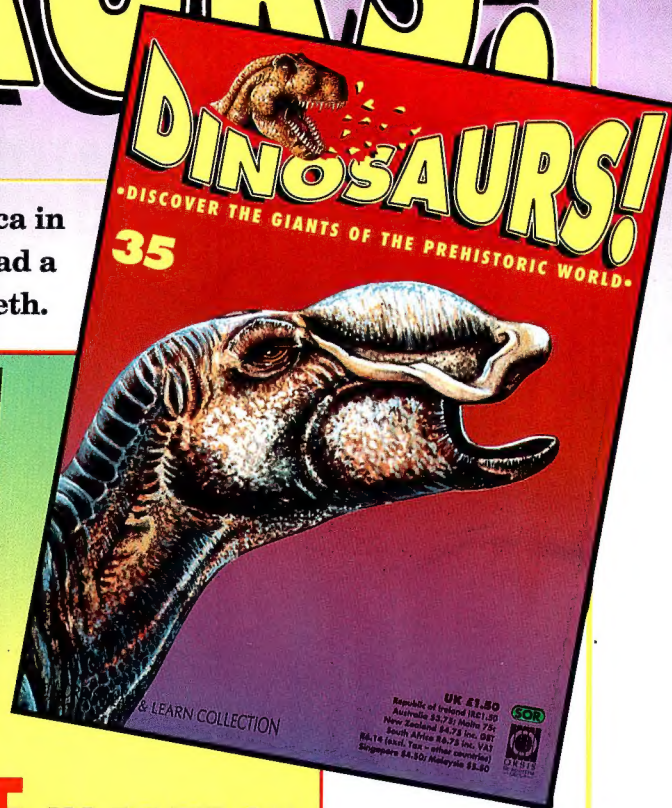
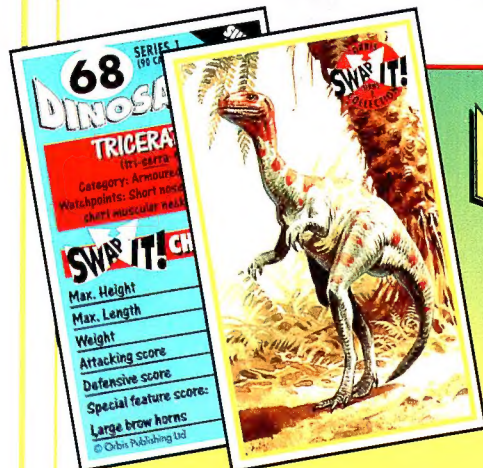


MYA = MILLION YEARS AGO

— COMING IN PART 35 OF —

DINOSAURS!

Meet *Edmontosaurus*, the duckbill from North America in IDENTIKIT. A hungry giant, *Edmontosaurus* had a shovel-like bill and 1000 teeth.



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ANSWERS TO DINO FACT FILE QUESTIONS: 1.c 2.a 3.a 4.b 5.b 6.b 7.a 8.b 9.a 10.c



Dr. David Norman of Cambridge
University answers your
dinosaur questions

ASK THE EXPERT

How many teeth do dicraeosaurids have?

The dicraeosaurids are a group of sauropod dinosaurs. They include *Dicraeosaurus* from East Africa which lived 140 MYA. Dicraeosaurids had many things in common with the giant sauropods such as *Diplodocus*. Like *Diplodocus* they had small, peg-like teeth. They had 32 teeth in their upper jaws, and 32 in their lower jaws, giving a total of 64 in their mouths altogether.

How many dinosaur skeletons are usually found on an expedition?

Sometimes experts find lots of skeletons, and sometimes they find only one, or just part of one. For example, only one skeleton of the giant sauropod *Seismosaurus* has ever been found, but the bones of about 10,000 individual *Maiasaura* are thought to have been uncovered in North America.

How deep were dinosaur footprints?

This depends on what the dinosaur was walking on. If it walked on hard, dry soil, it would not leave footprints. If it walked on sand or mud it left quite deep prints. Scientists have found some prints which are more than 30cm deep. They think these must belong to the heavy sauropods.

Who was the king of the dinosaurs?

Today we think of the lion as 'king of the jungle'. I think the really big meat-eating dinosaurs would be called the kings of the dinosaurs if men had lived during the Age of the Dinosaurs. The obvious king of the dinosaurs 70 million years ago would have been the terrifying *T rex*, and 145 million years ago it would have been *Allosaurus*.

